



U.S. Department of Energy
Idaho Operations Office

HWMA/RCRA Closure Plan for the INTEC Rare Gas Plant North Gas Cell System

Voluntary Consent Order SITE-TANK-005 Action Plan Tank System INTEC-055

February 2008

Idaho Cleanup Project

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Plant North Gas Cell System**

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**Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office**

ABSTRACT

This Hazardous Waste Management Act/Resource Conservation and Recovery Act closure plan was developed to fulfill a milestone under the Voluntary Consent Order SITE-TANK-005 Action Plan Tank System INTEC-055. This closure plan specifies the closure activities to be performed for components of the Rare Gas Plant North Gas Cell System at the Idaho Nuclear Technology and Engineering Center, Idaho National Laboratory Site. The components to be closed are the iodine adsorption system (comprising the iodine adsorption towers, a shell tank, and ancillary piping) and piping from the dissolver off-gas hold tanks. The iodine adsorption system contains liquid waste that exhibits the characteristic of toxicity for silver (U.S. Environmental Protection Agency Hazardous Waste Number D011). The piping associated with the dissolver off-gas hold tanks is managed for the corrosivity characteristic (U.S. Environmental Protection Agency Hazardous Waste Number D002). Therefore, these components and associated piping will be closed in accordance with Hazardous Waste Management Act/Resource Conservation and Recovery Act regulations for interim status hazardous waste tank systems. This closure plan presents the performance standards for clean closure and describes the methods that will be used to remove the hazardous waste and to decontaminate the components to meet the standards.

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ACRONYMS

AL	action level
COC	contaminant of concern
DEQ	State of Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
DOG	dissolver off-gas
EPA	U.S. Environmental Protection Agency
HWMA	Hazardous Waste Management Act
HWN	hazardous waste number
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
PE	professional engineer
RCRA	Resource Conservation and Recovery Act
RGP	Rare Gas Plant
VCO	Voluntary Consent Order

HWMA/RCRA Closure Plan for the INTEC Rare Gas Plant North Gas Cell System

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1. INTRODUCTION

This Hazardous Waste Management Act (HWMA) (State of Idaho 1983)/Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq. 1976) closure plan has been prepared for components of the Idaho Nuclear Technology and Engineering Center (INTEC) Rare Gas Plant (RGP) North Gas Cell System (hereinafter referred to as Voluntary Consent Order [VCO] SITE-TANK-005 Tank System INTEC-055). This system was included in the SITE-TANK-005 Action Plan of the VCO (DEQ 2000, 2007a) and was addressed in VCO system identification (INEEL 2002) and characterization documentation (EDF-2624).

The iodine adsorption system (two iodine adsorption towers [VES-WN-102, 98CPP00728; VES-WN-103, 98CPP00729], one shell tank [VES-WN-125; 98CPP00740], and ancillary piping) and piping from the dissolver off-gas (DOG) hold tanks (lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957) were characterized as having historically managed or as currently managing hazardous waste (EDF-2624). These tank system components will be clean-closed in accordance with HWMA/RCRA regulations at IDAPA 58.01.05.009 (40 CFR 265.197), which address closure and post-closure care for RCRA interim status tank systems. Clean closure is the removal of all hazardous waste and the removal or decontamination of all waste residues to meet site-specific performance objectives. These components contain mixed waste (both radioactive and hazardous waste). This closure plan addresses hazardous waste constituents only. The U.S. Department of Energy (DOE) will address residual radioactive contamination as appropriate under a separate regulatory authority.

The plan presents a description and operational history of VCO SITE-TANK-005 Tank System INTEC-055 and the components to be closed. The maximum hazardous waste inventories are identified along with the applicable U.S. Environmental Protection Agency (EPA) hazardous waste numbers (HWNs). The decontamination or removal actions for the components to be closed are described. Components to be closed by decontamination will meet site-specific action levels (ALs) specified in this closure plan. Upon completion of the activities specified in this closure plan, the components will be certified as closed in accordance with the requirements of IDAPA 58.01.05.009 (40 CFR 265, Subparts G and J).

2. FACILITY DESCRIPTION

Voluntary Consent Order SITE-TANK-005 Tank System INTEC-055 is part of the RGP, which is located in the Waste Treatment Building (CPP-604) at the Idaho National Laboratory (INL) Site. The INL Site encompasses approximately 890 mi² on the Eastern Snake River Plain in southeastern Idaho, west of Idaho Falls.

The INTEC facility, situated on the south-central portion of the INL Site (Figure 1), occupies an enclosed and secured area of approximately 0.39 mi². Work at INTEC includes receiving and storing spent nuclear fuel; environmental restoration; radiological deactivation, decontamination, and decommissioning activities; and mixed waste treatment.



Figure 1. Map of the INL Site.

The RGP was used to recover radioactive krypton and xenon from DOG released during the dissolution of spent nuclear reactor fuel. The RGP was built in 1953 and was last operated in 1988. The facility was taken out of service in 1992 after fuel reprocessing activities ceased (EDF-2624). A description and operational history of VCO SITE-TANK-005 Tank System INTEC-055 and the components to be closed are provided in the following subsections.

2.1 VCO SITE-TANK-005 Tank System INTEC-055 Description and Operational History

This subsection presents an overview of VCO SITE-TANK-005 Tank System INTEC-055; a detailed description of the tank system is provided in the system identification document (INEEL 2002). The RGP comprises three cells: north, middle, and south (see Figure 2). The north gas cell is located in the northeast portion of the RGP.

Figure 3 shows a schematic of VCO SITE-TANK-005 Tank System INTEC-055. In the northeast portion of the cell are the DOG hold tanks (VES-WN-100, 98CPP00726; VES-WN-101, 98CPP00727) to which lines 1 1/2" PSS-AR-130951, 1 1/2" PSS-AR-130957, and other ancillary piping are connected. Sections of the ancillary piping are located in the pump pan enclosure adjacent to the north gas cell (see Figure 2). The two iodine adsorption towers (VES-WN-102, 98CPP00728; VES-WN-103, 98CPP00729), which are elevated, are located directly south of the DOG hold tanks. Between and underneath these towers is the shell tank (VES-WN-125; 98CPP00740) (INEEL 2002).

The system provided for DOG storage as the gas was received from dissolvers and for removal of moisture, oxygen, and nitrogen oxides from the gas stream. Dissolver off-gas from the Fuel Process Building (CPP-601) and the Fluorinel Dissolution Process and Fuel Storage (FAST) Facility (CPP-666) was directed to the DOG hold tanks. The DOG hold tanks were dual-purposed: to scrub nitrogen oxides from the gas stream and to provide a steady DOG feed to the remainder of the system. Caustic solution was used as the scrub solution until 1982 when treated water replaced the caustic as the scrub solution.

Iodine also was removed from the DOG prior to xenon and krypton recovery. Off-gas from the DOG hold tanks was transferred to the iodine adsorption towers where iodine was removed from the off-gas in a chemical reaction with silver nitrate solution. The silver nitrate solution was supplied from the shell tank. The iodine needed to be removed to prevent fouling the charcoal adsorption beds (located in the RGP middle cell) that the DOG passed through in the recovery process (EDF-6543; INEEL 2002). The iodine adsorption towers and the shell tank were inactivated in 1958 after the charcoal adsorption beds were replaced with a cryogenic unit, and iodine no longer needed to be removed from the DOG (EDF-2624).

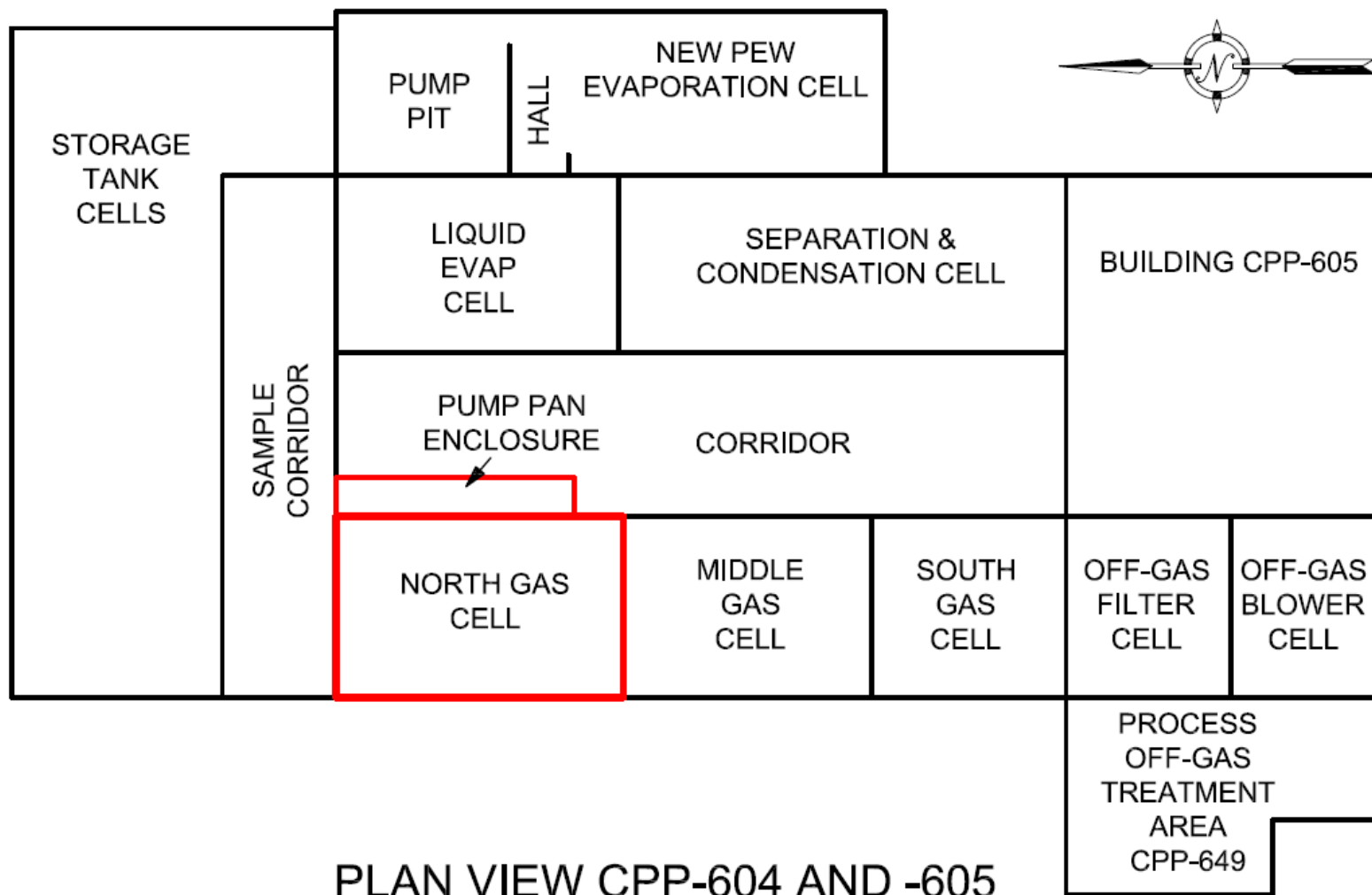


Figure 2. Floor plan showing the location of VCO SITE-TANK-005 Tank System INTEC-055 in the Waste Treatment Building (CPP-604) (INEEL 2002).

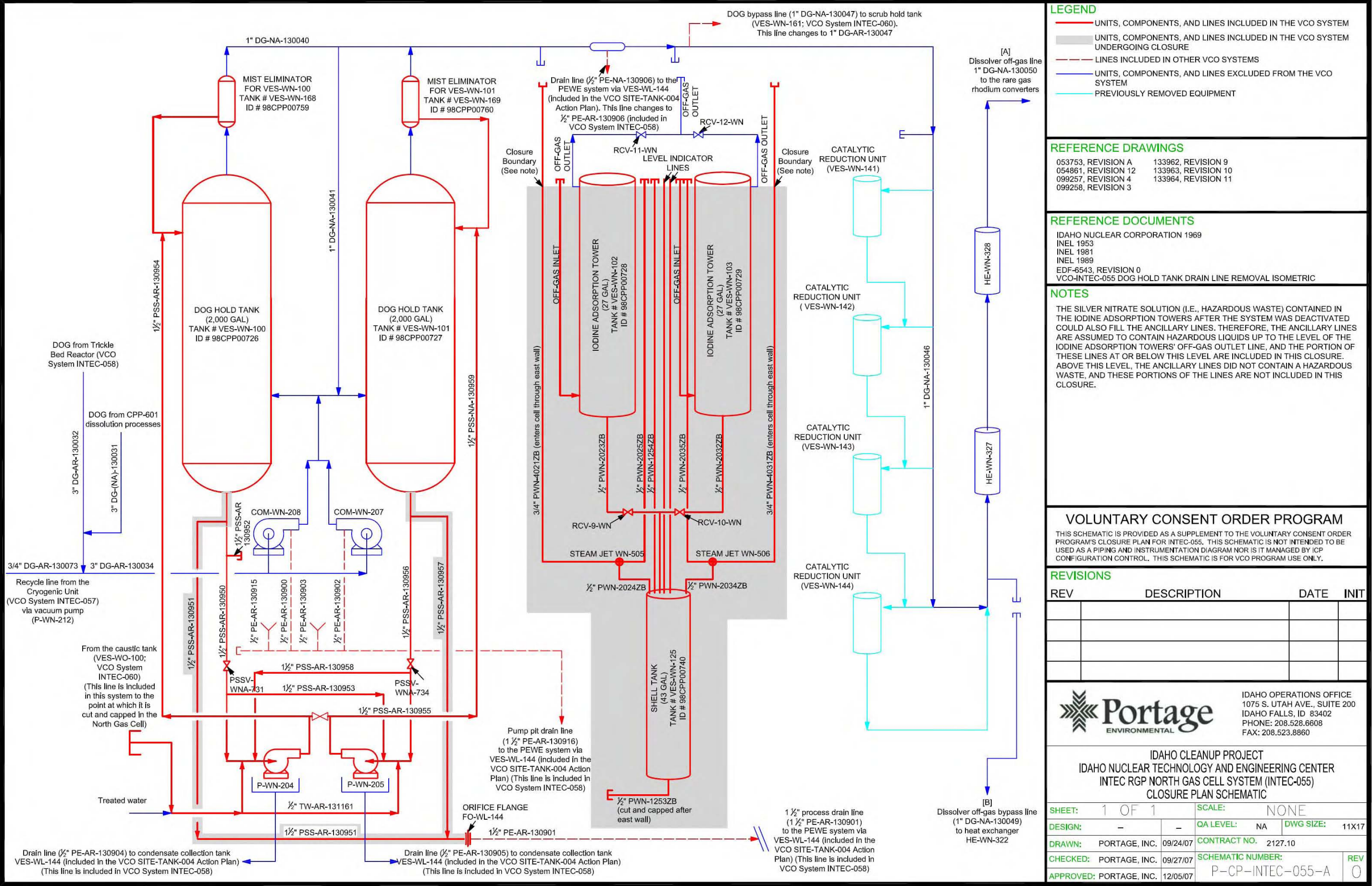


Figure 3. Schematic P-CP-INTEC-055-A. Units and components to be HWMA/RCRA closed.

2.2 Components to be Closed

As required by the VCO SITE-TANK-005 Action Plan (DEQ 2007a), a hazardous waste determination or a verification-of-empty determination was performed for VCO SITE-TANK-005 Tank System INTEC-055 components. The results are provided in “Voluntary Consent Order Tank System INTEC-055–INTEC Rare Gas Plant North Gas Cell System Characterization” (EDF-2624), which the State of Idaho Department of Environmental Quality (DEQ) approved in April 2003 (DEQ 2007a). The results indicated that the iodine adsorption system, which comprises the two iodine adsorption towers (VES-WN-102 and VES-WN-103), the shell tank (VES-WN-125), and ancillary piping, as well as piping from the DOG hold tanks (lines 1 1/2” PSS-AR-130951 and 1 1/2” PSS-AR-130957), historically managed or currently manages hazardous waste (EDF-2624). These components are to be clean-closed under this HWMA/RCRA closure plan. The closure boundary for these components is shown in Figure 3.

2.2.1 Iodine Adsorption System

The two iodine adsorption towers are identical tanks suspended in parallel above the north gas cell’s main floor. The capacity of each tower is 44 gal of liquid. However, because the towers are filled with 1/2-in. ceramic berl saddles, the operating capacity is approximately 27 gal. The berl saddles increase the surface area for more efficient exchange between the DOG and the silver nitrate scrubbing solution. Figure 4 shows a photograph of the iodine adsorption towers. Figure 5 shows ceramic berl saddles.

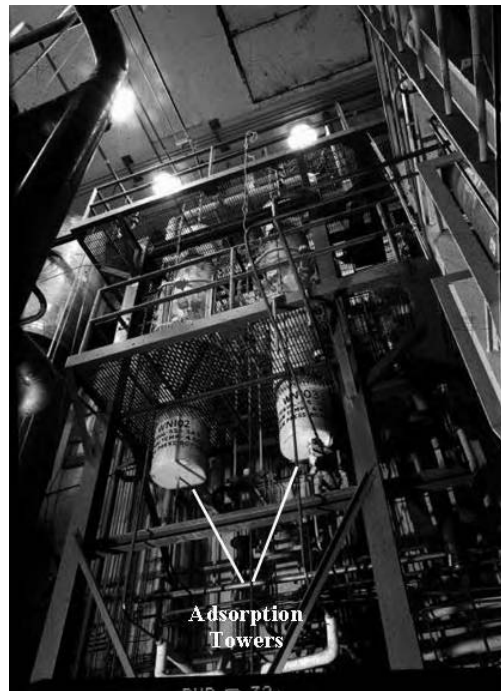


Figure 4. View of iodine adsorption towers (VES-WN-102, left; VES-WN-103, right) from the cell floor (EDF-6543).



Figure 5. Ceramic berl saddles (EDF-6543).

The shell tank is a stainless steel vertical, cylindrical tank that is supported approximately 24 in. above the north gas cell floor. Figure 6 shows the shell tank on the cell floor. The insulation on the jet suction lines exiting the tank at the top has been removed since this photograph was taken (EDF-6543).

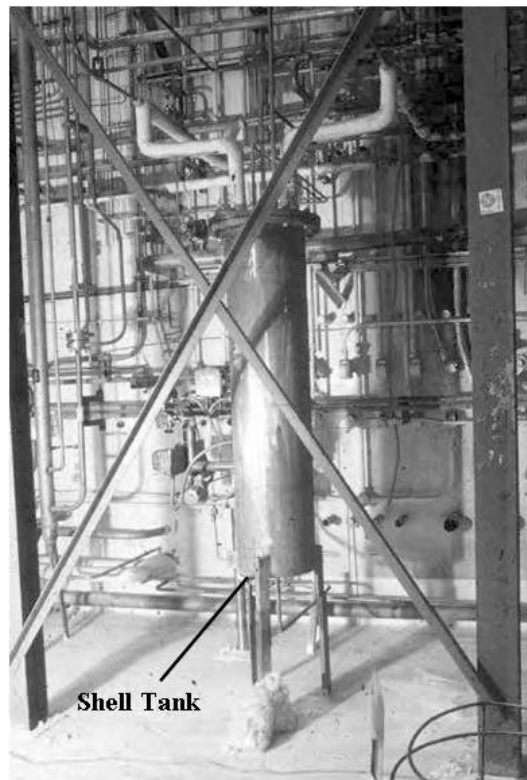


Figure 6. Shell tank (VES-WN-125) on the north gas cell floor (EDF-6543).

The ancillary piping associated with the iodine adsorption system is shown in Figure 3. Dissolver off-gas, silver nitrate solution, and steam were transferred to or from the adsorption towers and the shell tank via 1/2- and 3/4-in. stainless steel piping. A portion of the piping was cut and isolated after the system was taken out of service in 1958. Dissolver off-gas carrying iodine entered at the bottom of each tower, traveled upwards countercurrent to the silver nitrate solution, and then exited as scrubbed gas at the top of the towers. Steam jets transferred silver nitrate solution upward from the shell tank to the top of the adsorption towers. The silver nitrate solution trickled downward through the berl saddles, reacting with iodine in the upward-moving DOG. The liquid solution (and any precipitates) exited at the bottom of each tower, went through a pneumatically actuated control valve, and then merged into a common line. Liquids

in this common line drained into the top of the shell tank. Drainage for the shell tank was provided by a 1/2-in. pipe located at the bottom of the tank.

The closure boundaries were established because the iodine adsorption towers and the shell tank were found to contain liquid that was characterized as RCRA hazardous (EDF-2624). Since the level of silver nitrate (i.e., hazardous waste) in the iodine adsorption towers is not known, it is assumed for purposes of this closure that the maximum level of the silver nitrate solution in the iodine adsorption towers did not exceed the level of the off-gas outlet lines. This assumption was confirmed when characterization activities opened the iodine adsorption system for characterization sampling purposes. Since the iodine adsorption system was designed as a gravity-draining system, any hazardous liquid remaining in the iodine adsorption towers after the system was deactivated would also fill the ancillary lines. Therefore, the ancillary lines are assumed to contain hazardous liquids up to the level of the iodine adsorption towers' off-gas outlet lines and the portions of the ancillary lines at or below this level are included in this closure. Above this level, the ancillary lines did not contain hazardous waste and these portions of the lines are not included in this closure.

As shown in Figure 3, the closure boundary for the iodine adsorption system includes the two iodine adsorption towers, the shell tank, and the ancillary piping listed below. The following ancillary piping will be closed under this closure plan:

- Dissolver off-gas inlet piping. The DOG was not considered a hazardous waste. However, since the silver nitrate solution (i.e., hazardous waste) remained in the iodine adsorption towers after the system was deactivated, it is assumed that the hazardous waste would have filled these lines. Therefore, these lines are included in this closure at and below the level of the iodine adsorption towers' off-gas outlet lines.
- Silver nitrate solution suction lines at the shell tank (1/2" PWN-2024ZB and 1/2" PWN-2034ZB).
- Steam lines (3/4" PWN-4021ZB and 3/4" PWN-4031ZB) and steam jets (WN-505 and WN-506). The steam lines enter the cell through the east wall and travel downward to the steam jets. The steam lines are assumed to contain hazardous waste up to the level of the iodine adsorption towers' off-gas outlet lines; the portions of the steam lines at and below this level are included in this closure.
- Jetted silver nitrate solution lines (1/2" PWN-2025ZB and 1/2" PWN-2035ZB). When operational, these silver nitrate supply lines would have delivered product silver nitrate solution to the iodine adsorption towers. However, since the silver nitrate solution (i.e., hazardous waste) remained in the iodine adsorption towers after the system was deactivated, it is assumed that the hazardous waste would have filled these lines up to the level of the iodine adsorption towers' off-gas outlet lines. Therefore, the portions of these lines located at and below this level are included in this closure.
- Silver nitrate solution outlet lines (1/2" PWN-2023ZB and 1/2" PWN-2032ZB), including control valves (RCV-9-WN and RCV-10-WN) and common outlet line at bottom of towers.
- Shell tank drain line (1/2" PWN-1253ZB) to the capped location outside the east wall of the north gas cell.
- Shell tank vent line (1/2" PWN-1254ZB). Off-gas from the shell tank was not considered a hazardous waste. However, since the silver nitrate solution (i.e., hazardous waste) remained in the iodine adsorption towers and the shell tank after the system was deactivated, it is assumed that the

hazardous waste would have filled this vent line up to the level of the iodine adsorption towers' off-gas outlet lines. Therefore, this line located at and below this level is included in this closure.

- Level indicator lines. The level indicator lines are assumed to contain hazardous waste up to the level of the iodine adsorption towers' off-gas outlet lines. The portions of the level indicator lines at and below this level are included in this closure.

2.2.2 Dissolver Off-Gas Hold Tank Piping

The DOG hold tanks were used to remove nitrogen oxides from the DOG and to provide a steady DOG feed to the remainder of VCO SITE-TANK-005 Tank System INTEC-055. A caustic solution of sodium hydroxide was used initially to scrub the DOG. Lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957 are ancillary to the DOG hold tanks (VES-WN-100 and VES-WN-101; see Figure 3). This piping was used to transfer spent caustic scrubbing solution from the DOG hold tanks to the INTEC liquid waste management system (INEEL 2002). Because the caustic solution within the DOG hold tanks were replenished continually, the solution was not considered to be hazardous waste. However, at the point the scrubbing solution exited the DOG hold tanks and entered the INTEC waste liquid waste management system, the solution was considered to be hazardous waste, and the piping was considered to have managed hazardous waste. Therefore, lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957 to orifice flange FO-WL-144 are included in this closure.

3. MAXIMUM HAZARDOUS WASTE INVENTORIES AND CHARACTERISTICS

The two iodine adsorption towers (VES-WN-102 and VES-WN-103), the shell tank that held the silver nitrate solution (VES-WN-125), and ancillary piping, as well as piping from the DOG hold tanks (lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957) have been determined to have historically managed hazardous waste or to be currently managing hazardous waste (EDF-2624). The liquid in the two iodine adsorption towers and the shell tank exhibits the toxicity characteristic for silver (EPA HWN D011). The towers and shell tank are presumed to be full. As discussed in Subsection 2.2.1, hazardous liquid also is assumed to be present in the ancillary piping. Lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957 were found to have managed corrosive waste (EPA HWN D002) (EDF-2624). Table 1 summarizes the maximum hazardous waste inventory for these components.

Table 1. VCO SITE-TANK-005 Tank System INTEC-055 maximum hazardous waste inventory.

Component	Maximum Unit Capacity (gal)	Applicable EPA HWN
VES-WN-102 (iodine adsorption tower)	27	D011 (silver)
VES-WN-103 (iodine adsorption tower)	27	D011
VES-WN-125 (shell tank)	43.5	D011
Ancillary piping for VES-WN-102, VES-WN-103, and VES-WN-125	~ 4 ^a	D011
Ancillary piping to DOG hold tanks	~ 7.8 ^b	D002 (corrosivity)

a. Iodine adsorption system ancillary piping volume calculation sheet (A. Cram, ICP, October 2007).

b. DOG hold tank RCRA drain line volumes calculation sheet (A. Cram, ICP, October 2007).

4. CLOSURE PERFORMANCE STANDARDS

This section describes the performance standards for closure of VCO SITE-TANK-005 Tank System INTEC-055 and the activities that will be conducted to demonstrate that the closure performance standards have been met.

4.1 Regulatory Closure Performance Standards

The closure performance standards identified in IDAPA 58.01.05.009 (40 CFR 265.111 and 265.197) applicable to VCO SITE-TANK-005 Tank System INTEC-055 are:

1. The owner or operator must close the facility in a manner that minimizes the need for further maintenance (IDAPA 58.01.05.009 [40 CFR 265.111(a)]).
2. The owner or operator must close the facility in a manner that controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere (IDAPA 58.01.05.009 [40 CFR 265.111(b)]).
3. The owner or operator must close the facility in a manner that complies with the closure requirements of this subpart, including, but not limited to, the requirements of 40 CFR 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.381, 265.404, and 265.1102 (IDAPA 58.01.05.009 [40 CFR 265.111(c)]).

4.2 Required Activities for Achieving Closure Performance Standards

Voluntary Consent Order SITE-TANK-005 Tank System INTEC-055 closure and waste management activities to be conducted under HWMA/RCRA closure are described in Section 5 of this closure plan. The closure performance standards will be achieved by the following measures.

4.2.1 Standard 1

The owner or operator must close the facility in a manner that minimizes the need for further maintenance (IDAPA 58.01.05.009 [40 CFR 265.111(a)]).

This closure performance standard will be achieved by the following measures:

- The hazardous waste inventory will be removed and disposed of
- Tank system components subject to closure will either be removed and disposed of or decontaminated to the site-specific ALs specified in Section 5 of this HWMA/RCRA closure plan.

4.2.2 Standard 2

The owner or operator must close the facility in a manner that controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere (IDAPA 58.01.05.009 [40 CFR 265.111(b)]).

This closure performance standard will be achieved by the following measures:

- The hazardous waste inventory will be removed and disposed of
- Tank system components subject to closure will either be removed and disposed of or decontaminated to the site-specific ALs specified in Section 5 of this HWMA/RCRA closure plan.

4.2.3 Standard 3

At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless 40 CFR 261.3(d) applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for the tank systems must meet all of the requirements specified in 40 CFR 265, Subparts G and H (IDAPA 58.01.05.009 [40 CFR 265.197(a)]).

This closure performance standard will be achieved by the following measures:

- The hazardous waste inventory will be removed and disposed of
- Tank system components subject to closure will either be removed and disposed of or decontaminated to the site-specific ALs specified in Section 5 of this HWMA/RCRA closure plan
- Secondary containment is still needed for portions of the liquid waste management system and will be closed as part of that permitted system (DEQ 2007b).

5. CLOSURE ACTIVITIES

The general approach for closing VCO SITE-TANK-005 Tank System INTEC-055 is to decontaminate the iodine adsorption system (iodine adsorption towers [VES-WN-102 and VES-WN-103], the shell tank [VES-WN-125], and ancillary piping) to site-specific ALs (discussed in Subsection 5.1) and to remove and dispose of the associated piping from the DOG hold tanks (lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957). Lines with portions embedded in concrete walls will be cut as close as practical to the wall surface, and the embedded portions will be decontaminated (discussed in Subsection 5.3). The following subsections describe closure activities, waste management activities, and closure documentation required to satisfy the tank system closure performance standards for these components.

5.1 Decontamination Activities for Iodine Adsorption System

The iodine adsorption system will be decontaminated to satisfy site-specific ALs (see Table 2) by draining the system then flushing iteratively with water. The system contents and rinsates will be drained to the Process Equipment Waste Evaporator System via the sump tank (VES-WL-144) in the north gas cell. Prior to the final flush of the system, the berl saddles will be removed from each adsorption tower. A hazardous waste determination for the removed berl saddles will be conducted, and the saddles will be dispositioned as appropriate. The final flush will be conducted such that the water contacts all interior surfaces of components subject to closure. Water is an appropriate decontamination agent for the system because these components were designed to manage aqueous solutions (silver nitrate solution) and water is representative of potential leaching liquid that would contact the closed tank system.

Samples will be obtained from the final rinsate and analyzed to demonstrate compliance with the site-specific ALs. Final rinsate samples will be collected and analyzed in accordance with the "Sampling Procedure for HWMA/RCRA Closure of the INTEC Rare Gas Plant North Gas Cell System Voluntary Consent Order SITE-TANK-005 Action Plan Tank System INTEC-055" (SPR-180). Table 2 lists the contaminants of concern (COCs) and site-specific ALs. Process knowledge and analytical data from characterization activities limit the COCs for VCO SITE-TANK-005 Tank System INTEC-055 to barium, chromium, lead, mercury, and silver (constituents detected during characterization analysis). However, to be conservative, ALs were calculated for all Contract Laboratory Program metals regulated by HWMA/RCRA (i.e., listed in 40 CFR 261, Appendix VIII or 40 CFR 268.48) and that have published toxicity information.

Table 2. Contaminants of concern and corresponding site-specific AL.

Contaminant of Concern	Action Level (mg/kg - mg/L rinsate)
Antimony	8.9E+01
Arsenic	3.0E+00
Barium	5.9E+01
Beryllium	3.9E+01
Cadmium	5.9E-01
Chromium	3.0E+00
Lead	3.0E+00
Mercury	1.2E-01
Nickel	8.9E+01
Selenium	5.9E-01
Silver	3.0E+00
Thallium	6.6E+01
Vanadium	8.9E+01
Zinc	8.9E+01

5.2 Dissolver Off-Gas Hold Tank Piping Removal

Lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957 from the DOG hold tanks will be clean-closed by removal and disposal. These lines, which have portions embedded in concrete walls, will be cut as close as practical to the wall surface. The remaining stubs will be decontaminated as described in Subsection 5.3. A hazardous waste determination for the removed piping will be conducted to determine its proper disposition.

5.3 Embedded Lines

Short embedded piping stubs remaining after removal of lines 1 1/2" PSS-AR-130951 and 1 1/2" PSS-AR-130957 will be decontaminated using physical/abrasive techniques (e.g., scrubbing and scouring) and visually inspected to ensure no waste-related residues or staining remains. The performance standard criterion for decontamination of the piping stub internal surfaces will be decontamination to remove visible waste-related staining. Visible waste-related staining will be considered removed when the surface in question, viewed without magnification, is free of all visible hazardous waste except that residual staining from waste consisting of light shadows, slight streaks, or minor discolorations. Waste in cracks, crevices, and pits may be present provided that such staining and waste in cracks, crevices, and pits shall be limited to no more than 5% of the volume of any 1-ft piping length.

5.4 Waste Management

As required by IDAPA 58.01.05.009 (40 CFR 265.114), contaminated equipment and structures must be properly disposed of or decontaminated in accordance with applicable requirements. Waste generated during closure activities may include nonhazardous industrial waste, nonhazardous liquid waste, HWMA/RCRA hazardous waste, and mixed waste. All closure-generated wastes will undergo a hazardous waste determination in accordance with IDAPA 58.01.05.006 (40 CFR 262.11). All hazardous waste will be managed in accordance with the generator requirements of IDAPA 58.01.05.006 (40 CFR 262) and will be dispositioned appropriately (e.g., RCRA-hazardous waste transferred

to/disposed of at a RCRA-permitted treatment, storage, and disposal facility). Information regarding waste management during closure activities will be provided to the independent qualified professional engineer (PE) for closure certification and will be maintained as part of the project file.

5.5 Closure Documentation

Closure methods and attainment of the closure performance standards for units and components being HWMA/RCRA closed will be documented by performing the following:

- Closure activities will be monitored and/or reviewed by an independent qualified PE. Following successful completion of closure activities, the PE will certify that the closure was performed in accordance with the DEQ-approved closure plan.
- Information related to successful implementation of closure activities will be recorded or documented and provided to the PE, as requested, to support closure certification. Successful demonstration of achieving closure performance standards will require documentation of the following:
 - Waste management
 - Decontamination activities specified in this closure plan, including work orders, validated sampling data, and data quality assessment report(s), as appropriate.

6. CLOSURE SCHEDULE

Table 3 identifies the closure schedule that will be initiated following DEQ approval of this closure plan. This schedule reflects the time required for conducting closure activities and submitting information to the qualified PE for certification. As specified in IDAPA 58.01.05.009 (40 CFR 265.113), waste removal activities are required to be completed 90 days from the approval of the closure plan and closure is required to be completed within 180 days from the initiation of closure activities. An extension to these time periods is being requested at this time, pursuant to IDAPA 58.01.05.009 (40 CFR 265.113), to ensure that data of adequate quality are collected to show compliance with the closure performance standard. An extension is requested for the 180-day closure period to be able to perform closure activities adequately. Waste removal, decontamination, and closure activities cannot be completed within these time frames because of several factors including, but not limited to, the following:

- The need to provide radiological contamination controls to prevent the possible spread of contamination
- All work related to management of radioactive mixed waste requires additional time because of the requirements for care in work planning, including radiological work permits
- The time necessary for the analytical laboratories to complete analysis of samples and data validation, receive analytical results, and complete data quality assessment, as specified in the sampling procedure associated with this closure plan (SPR-180), to determine if the closure performance standards have been met.

Quarterly reports summarizing closure activity progress will be submitted to the DEQ by April 30, July 31, October 31, and January 31 of each year. Quarterly progress reports to DEQ will commence on the first of the aforementioned dates following Day 0 of the closure schedule.

Table 3. VCO SITE-TANK-005 Tank System INTEC-055 closure schedule.

Activity	Completion
DEQ approval of closure plan.	Day 0
Drain and flush components, remove berl saddles, complete compliance sampling.	Day 90
Remove waste piping.	Day 180
Perform laboratory analysis, data validation, and data quality assessment for closure certification samples.	Day 180
Closure activities complete.	Day 210
Professional engineer and owner/operator certification submitted to DEQ within 60 days of completion of closure.	Day 270 ^a

a. If closure activities are completed ahead of the proposed schedule, DOE will submit the closure certification to DEQ within 60 days of the completion of closure activities.

7. CLOSURE PLAN AMENDMENTS

Changes to the approved closure plan will be implemented in accordance with IDAPA 58.01.05.009 (40 CFR 265.112), "Closure Plan; Amendment of Plan." Should unexpected events during the closure period require modification of the approved closure activities or closure schedule, the closure plan will be amended or the DEQ will be otherwise notified within 30 days of the unexpected event. A written request detailing the proposed changes and the rationale for those changes, and a copy of the amended closure plan will be submitted to DEQ for approval or DEQ will be otherwise notified. Minor deviations from the approved closure plan, which are equivalent to or do not compromise the closure requirements and performance standards identified in the approved closure plan, may be made without prior notification to DEQ. Minor deviations will be identified in the documentation supporting the independent qualified PE certification.

8. CERTIFICATION OF CLOSURE

In accordance with IDAPA 58.01.05.009 (40 CFR 265.115), a certification of closure of VCO SITE-TANK-005 Tank System INTEC-055 will be submitted to the DEQ within 60 days of completing the closure activities. This certification, to be signed by an independent qualified PE and the DOE Idaho Operations Office, will document the completion of closure activities in accordance with the DEQ-approved closure plan and State of Idaho HWMA/RCRA requirements. The closure certification may also identify any minor changes to the closure plan made without prior DEQ approval. Closure of VCO SITE-TANK-005 Tank System INTEC-055 will be considered complete upon receipt of written acceptance issued by the DEQ. The VCO SITE-TANK-005 Tank System INTEC-055 is not a hazardous waste disposal facility; therefore, a “Notice in Deed” and a survey plat are not required.

9. COST AND LIABILITY REQUIREMENTS

In accordance with IDAPA 58.01.05.009 [40 CFR 265.140(c)], the federal government, as owner of the INL Site, is exempt from the financial requirements of IDAPA 58.01.05.009 (40 CFR Part 265, Subpart H). These provisions include requirements for providing cost estimates, financial assurance, and financial assurance mechanisms for closure; liability requirements; and requirements for the use of state-required mechanisms and for the state assumption of financial and liability requirements for the closure.

10. REFERENCES

- 40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register, as amended.
- 40 CFR 262, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register, as amended.
- 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, as amended.
- 40 CFR 268.48, "Universal Treatment Standards," *Code of Federal Regulations*, Office of the Federal Register, as amended.
- 42 USC 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976," as amended.
- DEQ, 2000, B. R. Monson, IDEQ, to D. N. Rasch, DOE-ID, Enclosure: "Consent Order," Idaho Code Section 39-4413, June 14, 2000.
- DEQ, 2007a, *Consent Order Action Plan*, October 19, 2007.
- DEQ, 2007b, "Partial Permit for HWMA Storage and Treatment for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center," RCRA Permit for the Idaho National Laboratory, Volume 14, INTEC Liquid Waste Management System, March 27, 2007.
- EDF-2624, 2003, "Voluntary Consent Order Tank System INTEC-055–INTEC Rare Gas Plant North Gas Cell System Characterization," Rev. 1, April 15, 2003.
- EDF-6543, 2006, "VCO INTEC-055 Engineering Evaluation for Berl Saddle Removal and Draining," Rev. 0, February 28, 2006.
- Idaho Nuclear Corporation, 1969, *Rare Gas Recovery Facility At The Idaho Chemical Processing Plant*, Idaho National Engineering Laboratory, TID-4500, April 1969.
- IDAPA 58.01.05.006, "Standards Applicable to Generators of Hazardous Waste," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality Rules, as amended.
- IDAPA 58.01.05.009, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality Rules, as amended.
- INEEL, 1998, *Idaho Chemical Processing Plant Safety Document Section 7.5 Rare Gas Recovery, Purification, and Packaging Status Addendum*, Idaho National Engineering and Environmental Laboratory, PSD-7.5 Add, Rev. 0, February 1998.
- INEEL, 2002, *Voluntary Consent Order SITE-TANK-005 System Identification*, "INTEC Rare Gas Plant North Gas Cell System (INTEC-055)," INEEL/EXT-2000-00037, Book 1-INTEC, Volume VIII, Section 2, Rev. 3, November 2002.

INEL, 1953, *Idaho Chemical Processing Plant Dissolver Off Gas Equipment Manual*, CPP 71, December 21, 1953.

INEL, 1981, *Rare Gas Plant Training and Qualification Manual*, September 1981.

INEL, 1989, *Idaho Chemical Processing Plant Safety Document Section 7.5 Rare Gas Recovery, Purification, and Packaging*, WIN-107-7.5, Rev. 4, October 1989. (This document contains UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION).

SPR-180, 2007, "Sampling Procedure for HWMR/RCRA Closure of the INTEC Rare Gas Plant North Gas Cell System Voluntary Consent Order SITE-TANK-005 Action Plan Tank System INTEC-055," current version.

State of Idaho, 1983, "Hazardous Waste Management," Idaho Statute, Title 39, "Health and Safety," Chapter 44, "Hazardous Waste Management" (also known as the Hazardous Waste Management Act of 1983).

11. DRAWINGS

053753, INL Reference Drawing, *Rare Gas Plant CPP-604 North Cell WN Area*, Rev. A, (INACTIVE) October 1968.

054861, INL Reference Drawing, *CPP-604 Rare Gas Plant North Cell Flowsheet WN-Area*, Rev. 12, (INACTIVE) October 1975.

099257, INL Reference Drawing, *CPP-604 Rare Gas Plant Fuel Diss. Off-Gas Trans. and Treat. Syst. Scrubbing P&ID*, Rev. 4, January 2000

099258, INL Reference Drawing, *CPP-604 Rare Gas Plant Fuel Diss. Off-Gas Trans. and Treat. Syst. Scrubbing P&ID*, Rev. 3, January 2000.

133962, INL Reference Drawing, *CPP-604 Rare Gas Plant Fuel Diss. Off-Gas Trans. & Treat. Syst. Storage P&ID*, 12176-CPP-604-P-3A, Rev. 9, June 1994.

133963, INL Reference Drawing, *CPP-604 Rare Gas Plant Fuel Diss. Off-Gas Trans. & Treat. Syst. Scrubbing P&ID*, 12176-CPP-604-P-3B, Rev. 10, (INACTIVE) June 1994.

133964, INL Reference Drawing, *CPP-604 Rare Gas Plant Purification P&ID*, 12176-CPP-604-P-4, Rev. 11, February 1999.

